Assessment Annotations
for the Curriculum Frameworks

Mathematics

Grades 4, 8, and 10

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MATHEMATICS- ASSESSMENT ANNOTATIONS

For The

Mathematics Curriculum Frameworks

The attached document provides supplemental assessment information to *Missouri's Framework for Curriculum Development in Mathematics K-12*. Contained within this assessment supplement are annotations that should be useful in understanding state and local responsibilities in assessing curriculum at the fourth, eighth, and tenth grade levels. This document indicates appropriate content and process specifications that should be useful in establishing curricula that prepares students to be proficient in mathematics.

Since the fourth and eighth grade benchmarks were established by the Framework's design, the column labeled, "What Students Should Know," establishes content that is appropriate for state testing. In addition, at the fourth, and eighth grade, the column labeled "What Students Should Be Able To Do" indicates appropriate processes for assessment. The last column labeled "Assessment Notes" further clarifies whether these processes are best assessed at the state or local level. If the phrase " Grade (4 or 8) state assessment" is shown'then this indicates that this process may be tested on the state mathematics examination at the indicated grade level.

Because benchmarks were not explicitly indicated at the tenth grade, the assessment notes provide information for both the "To Know" and "To Do" columns. The assessment notes indicate whether the content and processes are appropriate for assessment at the tenth grade on the state examination. Under the " Know" and "Do" categories in the assessment notes column, if the notation "Grade 10 state assessment" is indicated then this identifies content and processes that may be assessed at the state level. Under the " Do" of the assessment notes, process items are classified on whether these are assessed at the state level or better assessed at the local level. The notation "Beyond 10th grade state assessment" indicates material that students may or may not have covered at this point and therefore is not tested at the state level.

All of the benchmarks that were identified by the notation, "Grade (4, 8, or 10) state assessment," will not necessarily appear on a state test in any given year. The number of test items developed to access mathematical content and processes may vary from year-to-year. Only Framework pages that required assessment notes are provided within this document which results in the skipping of some page numbers.

V. Number Sense

What All Students Should Know

By the end of grade 4, all students should now

Counting and grouping strategies.

2. Mental computation and estimation strategies.

3. Place value.

4. Basic computation facts of addition, subtraction, multiplication, and division with whole numbers.

5. Addition and subtraction of fractions with like denominators.

6. U.S. customary and metric units of measure.

7. The appropriate use of calculators.

(Note: Assessed at local leve

What All Students Should Be Able To Do

NOTE: Each item in this column is designed to address several elements of "what all students should be able to do."

By the end of grade 4, all students should be able to

a. model, explore, develop, and explain number operations for whole numbers (NCTM Standard 7; MO 1.6, 2.1, 3.3)

b. use technology to explore numbers (NCTM Standard 6; MO 1.4, 1.6, 2.7)

c. use physical models and real-world experiences to construct number meanings (NCTM Standard 5; MO 1.10, 2.3, 4.1)

d. demonstrate an understanding of our numeration system by relating counting, grouping, and place value concepts (NCTM Standard 6; MO 1.6, 3.6, 4.1)

e. utilize number sense to develop number meanings and explore number relationships (NCTM Standard 6; MO 1.6, 3.3)

Fourth Grade Assessment Notes

Do

a. Grade 4 state assessment

b. Local assessment

c. Local assessment

d. Grade 4 state assessment

e. Grade 4 state assessment

V. Number Sense

What All Students Should Know	What All Students Should Be Able To Do	Fourth Grade Assessment Notes
	f. use a variety of mental computation and estimation strategies to solve specific problems (NCTM Standard 5; MO 1.10, 3.3, 4.1)	
	g. demonstrate an understanding of the attributes of length, capacity, weight, area, volume, time, temperature, and angle (NCTM Standard 5; MO 1.6, 4.1)	Do f. Grade 4 state assessment g. Grade 4 state assessment
	h. make and use standard and nonstandard measurements in problems and everyday situations (NCTM Standard 5; MO 3.2, 3.3)	h. Grade 4 state assessment i. Grade 4 state assessment
	i. explore the concepts of fractions, mixed numbers, and decimals and be able to apply them to problem situations (NCTM Standard 12; MO 1.6, 3.2, 3.3, 4.1)	

V. Number Sense

What All Students Should Know	What All Students Should Be Able To Do	Eighth Grade Assessment Notes
By the end of grade 8, all students should know	**NOTE: Each item in this column is designed to address several elements of "what all students** should be able to do."	
1. Addition, subtraction, multiplication, and division with rational numbers.	*By the end of grade 8, all students should be able to* a. extend understanding and ability to apply whole number operations to all rational numbers (such as integers, and fractions, decimals) (NCTM Standard 6; MO 3.2, 3.3, 4.1)	Do a. Grade 8 state assessment
2. Numbers and their relationships can be represented in multiple forms.	b. use multiple representations of equivalent forms of numbers such as integers, fractions, decimals, percent, exponents, and scientific notation in a variety of situations (NCTM Standard 5; MO 1.6, 1.10)	b. Grade 8 state assessment
3. The appropriate use of technology.	c. describe connections and relationships of numbers such as ratios, proportions, and percents in problem situations (NCTM Standard 5; MO 1.6, 2.1)	c. Grade 8 state assessment
	d. investigate number forms such as fractions, decimals, and percents, and demonstrate their use in today's society (NCTM Standard 5; MO 1.10, 2.2‘ 4.1)	d. Grade 8 state assessment

V. Number Sense

What All Students Should Know	What All Students Should Be Able To Do	Eighth Grade Assessment Notes
	e. develop, analyze, and explain procedures for computation and techniques for estimation (NCTM Standard 7; MO 2.3, 3.3)	
	f. develop, analyze, and explain methods for solving proportions (NCTM Standard 7; MO 2.3, 3.3)	Do e. Grade S state assessment f. Grade 8 state assessment
	g. check and explain the reasonableness of solutions, strategies, and results (NCTM Standard 7; MO 1.7, 3.3, 3.7, 4.1)	g. Grade 8 state assessment h. Grade 8 state assessment
	h. select appropriate methods of computation, such as mental arithmetic, estimation, calculator, computer, and paper/pencil to reflect upon solutions, strategies and results (NCTM Standard 7; MO 3.3, 3.6, 3.7)	i. Grade S state assessment
	i. represent numerical relationships in one- and two-dimensional graphs (NCTM Standard 5; MO 2.1, 2.7)	

V. Number Sense

What All Students Should Know

By the end of grade 12, all students should know

1. Addition, subtraction, multiplication, and division with real numbers.
2. Numbers and their relationships can be represented in multiple forms.
3. The appropriate use of technology.
4. Data can be organized in many forms.

What All Students Should Be Able To Do

NOTE: Each item in this column is designed to addmss several elements of "what all students should be able to do."

By the end of grade 12, *all students should* be *able to*

a. develop, analyze, and explain procedures used for representing and analyzing relationships in tables, verbal rules, equations, and graphs (NCTM Standards 5 and 6; MO 1.6, 1.8, 1.10, 2.6)

b. analyze the effects of parameter changes on the graphs of functions (NCTM Standards 5 and 6; MO 1.6, 3.6, 4.1, 4.7)

c. analyze and describe relationships and the resulting effects between changes in an independent variable and a dependent variable (NCTM Standards 5 and 6; MO 1.6, 3.3, 4.1)

Tenth Grade Assessment Notes

Know	Do
1. Grade 10 state assessment	a. Grade 10 state assessment
2. Grade 10 state assessment	b. Grade 10 state assessment
3. Grade 10 state assessment	c. Grade 10 state assessment
4. Grade 10 state assessment	